In the Specification

The specification has been amended at page 1 by adding a CROSS-REFERENCE TO RELATED APPLICATIONS paragraph as follows:

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is related to and claims benefit of priority to (i) European Patent Application No. 991125527.7, filed 01 July 1999, (ii) U.S. Provisional Patent Application Serial No. 60/142,534, filed July 7, 1999, entitled "AUTOPROTECTED OPTICAL COMMUNICATION RING NETWORK," and (iii) European Patent Application No. 01-11594.8, filed 31 May 2000, all of which are incorporated herein by reference.

On Page 12, please replace the paragraph beginning at Line 20 with:

Preferably, the plurality of transmitting transponders include a first transmitting transponder that is optically coupled to the first optical carrier and is configured to modulate a signal at the first wavelength. A second transmitting transponder $\left(TxT_1(\lambda_y)\right)$ is optically coupled to the first optical carrier and is configured to modulate a signal at a second wavelength. A third transmitting transponder is optically coupled to a second optical carrier and is configured to modulate a signal at the first wavelength. The plurality of receiving transponders include a first receiving transponder that is optically coupled to the [[first]] **second** optical carrier and is configured to demodulate a signal at the first wavelength. A second receiving transponder is optically coupled to the [[first]] **second** optical carrier and configured to demodulate a signal at the second wavelength. A third receiving transponder is optically coupled to the ~~second~~ **first** optical carrier and is configured to demodulate a signal at the second wavelength. Under the normal condition, the optical switches are configured to connect the optical transmitter to the first transmitting transponder [[and]] **or** to the third transmitting transponder, to connect the first receiving transponder to the third transmitting transponder, to connect the second receiving transponder to the optical receiver, and to connect he third receiving transponder to the optical receiver [[and]] **or** to the second transmitting transponder.

On Page 13, please replace the paragraph beginning at Line 12 with:

Preferably, the node further includes another optical transmitter that is configured to generate an optical signal that includes information to be transmitted in the network, and another

optical receiver that is configured to receive an optical signal that includes information has been transmitted in the network. The plurality of transmitting transponders includes a fourth transmitting transponder that is optically coupled to the second optical carrier and is configured to modulate a signal at the second wavelength. The plurality of receiving transponders include a fourth receiving transponder that is optically coupled to the first optical carrier and is configured to demodulate a signal at the first wavelength. During normal condition, the optical switches are configured to connect the first receiving transponder to the third transmitting transponder [[and]] **or** to the other receiver, to connect the fourth receiving transponder to the other receiver, and to connect the other optical transmitter to the second transmitting transponder [[and]] **or** to the fourth transmitting transponder.

On Page 17, please replace the paragraph beginning at Line 12 with:

A pair of nodes are arranged to exchange data through the use of wavelengths λ_x, λ_y. Under normal operating conditions, on the working path as defined by the pair of nodes, a bidirectional working link is established by transmitting optical signals at the first wavelength λ_x on the external ring 2 (in the counter clockwise direction) and at the second wavelength λ_y on the internal ring 3 (in the clockwise direction). The second wavelength λ_y is not used on the external ring 2; the first wavelength λ_x is **not** used on the internal ring 3. The second wavelength λ_y and the first wavelength λ_x can then be used on the external ring 2 and, respectively, on the internal ring 3, to provide optical protection, as herein below described. The wavelengths that are used under normal operating conditions (i.e., λ_x on the external ring 2 and λ_y on the internal ring 3) to perform working links are identified with a "w" suffix $\left(\lambda_{x,w}, \lambda_{y,w}\right)$, while the wavelengths which are adapted to be used for protection (i.e., λ_y on the external ring 2 and λ_x on the internal ring 3) are identified with a "p" suffix $\left(\lambda_{x,p}, \lambda_{y,p}\right)$.

On Page 17, please replace the paragraph beginning at Line 24 with:

The first and the second wavelengths λ_x, λ_y can be used on the protection path associated with the corresponding pair of nodes to perform a further bidirectional working link between the first and the second node or to perform further bidirectional working links between other pairs of nodes (which may include one of the previously considered nodes), provided that those further working links do not overlap with each other and with the above considered one.

Thus, in general, the pair of wavelengths λ_x, λ_y defines a "logical ring", i.e., a virtual ring which may include many non-overlapping working links operating at $(\lambda_{x,w}, \lambda_{y,w})$. Protection wavelengths $\lambda_{x,p}, \lambda_{y,p}$ are not used under normal operating conditions, and are shared among the different working links operating at ~~$\lambda_{x,p}, \lambda_{y,p}$~~ $\underline{\lambda_{x,w}, \lambda_{y,w}}$ (i.e., on the same logical ring). Overlapping working links can only be part of different logical rings and operate at different wavelengths. ·

On Page 20, please replace the paragraph beginning at Line 5 with:

Receivers Rx_1, Rx_2 output information from the two transmitters that are connected to network 1. Receivers Rx_1, Rx_2 may be adapted to receive signals at wavelengths that are not included in the transmission wavelength band of network 1, since receiving transponders RxTs provide the signals from the network 1 with a wavelength adapted for reception receivers Rx_1, Rx_2. Rx_1, Rx_2 may be, for example, a standard ~~Sonet OC 8/SDH~~ **Sonet OC-48/SDH** STM-16 terminal (produced for example by Nortel). Different bit rate terminals can be used provided that the receiving transponders are compatible.

On Page 23, please replace the paragraph beginning at Line 11 with:

Switch 25 has inputs 25a and [[26b]] **25b** that are coupled to the receiving transponder $RXT_2(\lambda_x)$ and the receiving transponder $RxT_1(\lambda_y)$ respectively. Switch 25 has an output 25c that is coupled to the input 22b of the switch 22, and an output 25d that is coupled to the receiver Rx2.

On Page 28, please replace the paragraph beginning at Line 2 with:

The node structure previously described is adapted to manage two working links on the same logical ring. However, if the client traffic pattern requires only one working link to be terminated at a node, such node can be sub-equipped; that is, fewer components can be utilized. This situation is shown in Figure 6, in which a one-link node 20j is adapted to manage a single working link on the left-hand side, shown under normal operating conditions. Node 20j differs from the node 20i of Figure 3 in that the transmitter Tx_2, the receiver Rx_2, the receiving transponder $RXT_1(\lambda_x)$ and the transmitting transponder $TxT_2(\lambda_y)$ of node 20i are absent, and in that the node 20j includes a switch unit 115 which does not utilize switches 24, 25 of switch unit 15. In contrast to the architecture of Figure 3, the receiving transponder $RXT_2(\lambda_x)$ is directly coupled to the input 22b of the switch 22 and the output 23d of switch 23 is directly coupled to the transmitting transponder $TxT_1(\lambda_y)$. The single working link that is managed by node 20j includes signals that are sent by node 20j to another node at the working wavelength [[$\lambda_{y,w}$]] $\underline{\lambda_{x,w}}$ on the external ring 2 as well as signals that are received by node 20j from the other node at the working wavelength $\lambda_{y,w}$ on the internal ring 3. Protection wavelengths $\lambda_{x,p}$ and $\lambda_{y,p}$ are managed in the same way as previously described with respect to the two-link node.

On Page 30, please replace the paragraph beginning at Line 15 with:

Each working link is controlled by the associated two terminating nodes. For a working link that operates at working wavelengths $\lambda_{x,w}$, $\lambda_{y,w}$, the two nodes at the end of the link provide the add/drop functions on working wavelengths $\lambda_{x,w}$ and $\lambda_{y,w}$ to/from the set of transmission wavelengths $(\lambda_1, ..., \lambda_N)$. Moreover, all the required monitoring functions on the transmitted signals (e.g., optical power level, channel identifier, BER performance, etc.) are performed at these terminating nodes. It is noted that the nodes that are not involved in processing signals at these working wavelengths $\lambda_{x,w}$ and $\lambda_{y,w}$ simply bypass the signals. Each node at the end of a working link using wavelengths [[$\lambda_{x,p}$]] $\underline{\lambda_{x,w}}$ and [[$\lambda_{y,p}$]] $\underline{\lambda_{y,w}}$ also control the protection wavelengths [[$\lambda_{xp,wp}$]] $\underline{\lambda_{x,p}}$ and $\lambda_{y,p}$; these protection wavelengths are utilized by all the working links of the corresponding logical ring. The other nodes (i.e., the

nodes external to this logical ring) do not perform any operation on $\lambda_{w,p}$ and $\lambda_{y,p}$, as these wavelengths are simply bypassed through these nodes. Basically, the nodes that are not included in a logical ring (i.e., nodes that do not terminate a working link on a particular logical ring) can be completely transparent to the wavelengths associated with the logical ring.

On Page 31, please replace the paragraph beginning at Line 21 with:

With reference to Figure 3, the signal flow inside the node 20i, under normal operating conditions, is now described. Upon reception of the optical signals, the OADM 4, 5 drop the wavelengths associated with the logical rings. All the other wavelengths may be directly bypassed to the node output without any processing. OADM 4 drops from the set of transmission wavelengths $\lambda_1, ..., \lambda_N$ on the external ring 2 both the working and protection wavelengths $\lambda_{x,w}$, $\lambda_{y,p}$, (and possibly working and protection wavelengths of other logical rings to be managed), while OADM 5 drops from the set of transmission wavelengths $\lambda_1, ..., \lambda_N$ on the internal ring 3 both the working and protection wavelengths [[$\lambda_{x,w}$]] $\mathbf{\lambda_{x,p}}$ [,]] **and** $\lambda_{y,p}$ [[,]] [[$\lambda_{y,w}$]] (and possibly working and protection wavelengths of other logical rings). Wavelengths $\lambda_{x,w}$, $\lambda_{y,p}$, $\lambda_{y,w}$ and $\lambda_{x,p}$ are sent directly to the respective receiving transponders $RXT_1(\lambda_x)$, $RxT_1(\lambda_y)$, $RXT_2(\lambda_y)$, and $RXT_2(\lambda_x)$, in which, after electrical conversion, information related to the link (link signaling) is extracted and sent to the CPU 16 for processing. After processing, wavelengths $\lambda_{x,w}$, $\lambda_{y,p}$, $\lambda_{y,w}$ and $\lambda_{x,p}$ are converted back to optical signals with a new optical format.

On Page 35, please replace the paragraph beginning at Line 10 with:

If the failure affects only the transmission from node 20c to node 20f (along the external ring 2), a similar sequence of operations is performed. In this case, however, node 20f detects the failure. Under a scenario in which both the transmission directions are affected by the failure, the first node as between nodes 20c and 20f that detects the absence of signals or of a signal quality degradation sends the other node the failure message (preferably along both the external ring 2 and the internal ring 3 by using the protection wavelengths [[$\lambda_{y,p}$]] $\mathbf{\lambda_{x,p}}$ and $\lambda_{y,p}$). This first node subsequently operates a reconfiguration of its switch unit 15. The other

node is alerted to the presence of a failure in the considered link by detecting the failure itself or by receiving the failure message from the first node (and only from one direction, in the preferred case of the bidirectional message transmission). In response, this other node sends a failure message back to the first node and operates to initiate a reconfiguration of its switch unit 15.